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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/766,103 | 01/27/2004 | Willie W. Ng | B-4585 619759-6 | 2200 |

7590

01/05/2006

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| EXAMINER |
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LANE, JEFFREY D

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2828

DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|----------------------------------|--|
| Office Action Summary | Application No. 10/766,103 | Applicant(s) NG ET AL. | |
| | Examiner Jeffrey D. Lane | Art Unit 2828 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/14/05</u> . | 6) <input type="checkbox"/> Other: _____ |

Claim Objections

1. Claim 4 is objected to because of the following informalities: "said" integration platform is not mentioned in claims 1 or 3. For Examination purposes it will be interpreted as: The reconfigurable laser transmitter of claim 3 wherein said microdisk is heterogeneously integrated with an integration platform. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 6-10, 13, 15-17, and 19-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Orenstein et al. (US 6,940,878).

As for claim 1, Orenstein discloses in figure 3A, A reconfigurable laser transmitter comprising: a gain element (See column 3 lines 36-37) having an optical output; a first optical path Laser WG receiving optical output from said gain element; a tunable microresonator A optically coupled with said first optical path; a second optical path coupled with said tunable microresonator A; and a fixed grating B coupled with said second optical path.

As for claim 6 and 7, Orenstein discloses, "Here, the tuning is performed only by a very slight tuning of the rings relatively to each other to apply the Vernier effect, and due to this small tuning, only a very small amount of power (**current**) is required." (Column 3 lines 60-63)

As for claim 8, Orenstein discloses, "This configuration is generally similar to the prior art SGDBR or SSGDBR structures, but differs therefrom in that one of the two gratings (FIG. 3A) or both of them (FIG. 3B) is replaced by microring resonator(s)." (Column 3 lines 45-48)

As for claim 9, Orenstein discloses, "The two laser mirrors are made of sampled (SGDBR) or super structure gratings (SSGDBR) each to generate a spectral sequence of high transmission peaks ... a spectral peak of one mirror overlaps the spectral line of the other (Vernier tuning)" (Column 1 lines 31-37)

As for claim 10, Orenstein discloses in figure 3A, A method for reconfiguring a wavelength of a laser comprising the steps of: coupling a tunable microresonator A having a passband to a fixed grating having a plurality of reflection peaks (See column 1 lines 31-37); and tuning said tunable microresonator A such that the passband of said tunable microresonator A is aligned with one of said plurality of reflection peaks of said fixed grating (See column 1 lines 31-37).

As for claim 13 and 16, Orenstein discloses, "Here, the tuning is performed only by a very slight tuning of the rings relatively to each other to apply the Vernier effect, and due to this small tuning, only a very small amount of power (**current**) is required." (Column 3 lines 60-63)

As for claim 15, Orenstein discloses, "This configuration is generally similar to the prior art SGDBR or SSGDBR structures, but differs therefrom in that one of the two gratings (FIG. 3A) or both of them (FIG. 3B) is replaced by microring resonator(s)." (Column 3 lines 45-48)

As for claim 17, Orenstein discloses, in figure 3A, A method of configuring a transmitter to transmit one of a plurality of wavelengths (see column 3 line 67 – column 4 line 4), said method comprising the steps of: passing a spectrum of light from a gain element (See column 3 lines 36-37) into a tunable microresonator A; selecting a first portion of said spectrum of light to be transmitted by said transmitter (see column 3 line 67 – column 4 line 4); and electrically tuning said tunable microresonator (see column 3 lines 60-63), wherein a second portion of said spectrum of light is to be transmitted by said transmitter.

As for claim 19, Orenstein discloses, "Here, the tuning is performed only by a very slight tuning of the rings relatively to each other to apply the Vernier effect, and due to this small tuning, only a very small amount of power (**current**) is required." (Column 3 lines 60-63)

As for claim 20, Orenstein discloses in figure 3A, the step of selecting a first portion further comprises the step of coupling a fixed optical grating B to said tunable microresonator A.

As for claim 21, Orenstein discloses, "This configuration is generally similar to the prior art SGDBR or SSGDBR structures, but differs therefrom in that one of the two gratings (FIG. 3A) or both of them (FIG. 3B) is replaced by microring resonator(s)." (Column 3 lines 45-48)

As for claim 22, Orenstein discloses in figure 3B, A method of configuring a transmitter to transmit one of a plurality of wavelengths (see column 3 line 67 – column 4 line 4), said method comprising the steps of: passing a spectrum of light from

a gain element (See column 3 lines 36-37) into a tunable microresonator A; selecting a first portion of said spectrum of light to be transmitted by said transmitter (see column 3 line 67 – column 4 line 4); and electrically tuning said tunable microresonator (see column 3 lines 60-63), wherein a second portion of said spectrum of light is to be transmitted by said transmitter; wherein the step of selecting a first portion further comprises the step of coupling a fixed optical-resonator filter B to said tunable microresonator A. The optical-resonator filter property of microring B of figure 3B is shown in Fig 4A and 4B.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2 and 12 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Orenstein et al. (US 6,940,878).

As for claim 2, Orenstein discloses in Column 3 lines 33-48 an integration platform (processed wafer, line 42) and wherein said gain element (1.55 layer, line 37), said first optical path (wave guide layer, line 39), said tunable microresonator (microring, line 48), said second optical path (wave guide layer, line 39), and said fixed grating (SGDBR, line 46) are integrated with said integration platform. If the all the components

are grown on a "processed wafer" then the "processed wafer" would be an integration platform and all the components integrated by growth on the "processed wafer".

As for claim 12, Orenstein discloses in figure 3, an integrated said tunable microresonator A with an integration platform (processed wafer, column 3 line 42). If the resonator was homogenous (made out of exactly the same material with no variations, or not heterogeneous) it could not function as a resonator. The examiner assumes that the reference is enabled and therefore heterogeneous. Other figures lend to this namely 5A, 5C, 5D, and 6.

6. Claims 3, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein et al. (US 6,940,878) in view of Soref et al. (US 6,195,187). Orenstein discloses all that pertains to claims 1, 10 and 17 (see above). However Orenstein does not disclose that the microresonator is a microdisk. Soref discloses, "To alleviate this contact problem, we have designed a microdisk resonator that is optically equivalent to the microring resonator. The microdisk has a more favorable contact geometry." (Column 5 lines 60-64) Therefore it would have been obvious to one of ordinary skill at the time of the invention to use a microdisk instead of a microring in Orenstein's transmitter because it has a more favorable contact geometry.

7. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein et al. (US 6,940,878) in view of Conradi (US 6,061,369). Orenstein discloses, all that pertains to claims 1 and 10 (see above). However Orenstein does not disclose using a grating with a temperature sensitivity less than $0.1 \text{ }^{\circ}\text{C}/\text{Å}$. Conradi discloses, "An advantage of writing the frequency into the silica fiber is that the silica has a small coefficient of

thermal expansion (.about.5.times.10.sup.-7 /.degree. C.) and the resonant Bragg frequency changes with the same dependence. In particular, the center frequency of the Bragg grating in silica will normally vary by less than 10 GHz (0.1 nm) over a 100.degree. C. range" (Column 3 lines 2-7). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use silica to fabricate the grating because it has a small coefficient of thermal expansion. Silica also has a temperature sensitivity of less than 0.1 Å/°C as stated (see quotation above).

8. Claim 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein et al. (US 6,940,878) in view of Pelekhaty (US 6,215,592). Orenstein discloses all that pertains to claim 17 (see above). However Orenstein does not disclose operating in frequencies set according to an international standard. Pelekhaty discloses, "The particular wavelength designations may be chosen to correspond to the ITU channel designation grid to facilitate operability with common network elements." (Column 4 lines 56-58). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to choose a wavelength with in the ITU channel designation to facilitate operability with network elements.

9. Claim 1, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frick (US 2004/0120638) in view of Painter et al. (US 2002/0122615).

As for claim 1 Frick discloses in figure 8, A reconfigurable laser transmitter comprising: a gain element 205 having an optical output; a first optical path 204 receiving optical output 206 from said gain element 205; a tunable microresonator 200 optically coupled with said first optical path 204; a second optical path 214 coupled with

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said tunable microresonator 200. However Frick does not disclose having a grating. Painter discloses, "It may be desirable to provide one or more layers of a multi-layer waveguide <optical path> structure with a grating. Such a grating may serve to provide lateral confinement for a support optical mode, and may also cause the waveguide to exhibit desirable dispersive properties." (See Paragraph [0191]). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a grating on the on the optical path to provide lateral confinement.

As for claim 3 Frick discloses in figs 32 and 33 that the resonator is a microdisk 1102 (also see abstract).

As for claim 4, Frick discloses in fig 32 the microdisk 1102 is heterogeneously integrated with integration platform 1108.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey D. Lane whose telephone number is (571) 272-1676. The examiner can normally be reached on Monday thru Friday 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrey D Lane
Examiner
Art Unit 2828

JDL



JAMES MENEFEFEE